

HOWARD INDUSTRIES INC. -- LAUREL, MS

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COMMENTS TO THE U.S. EPA ENERGY STAR, PRODUCT SPECIFICATION,
EFFICIENCY PROGRAM FOR DISTRIBUTION TRANSFORMERS
DRAFT 2, VERSION 1.0

Howard Industries is a leading manufacturer of liquid immersed Distribution Transformers and as a stakeholder offers the following comments as feedback to the Energy Star Product Specification for Distribution Transformers, Eligibility Criteria, Draft 2, Version 1.0.

We are a full line supplier of liquid immersed distribution transformers in the United States utilizing both silicon and amorphous core construction. All of our transformers are manufactured in the USA.

We support the EPA's effort to launch this Voluntary Energy Star specification for medium voltage, liquid immersed distribution transformers.

DEFINITIONS

We believe that certain of the existing DOE definitions could be adjusted to reflect current technology. We do not believe that this materially changes the DOE definitions, but it does make them more accurate. Since the Energy Star program is voluntary and intended to reflect the "leading edge" of what can be practically attained, appropriate adjustments to definitions for Energy Star purposes to incorporate current technology will not adversely affect implementation or enforcement of DOE's standards.

1. Definition of "Transformer"

The current definition of "transformer" specifies that it must be constructed with "coils of insulated wire". Manufacturers do not limit their choice of conductors to insulated wire only. Some use insulated foil or sheet conductors in their windings. Therefore, "insulated wire" should be replaced with "insulated conductor" in the definition of "transformer."

2. Definition of "Distribution Transformer:" Scope

We appreciate EPA's general interest in matching the Energy Star program for distribution transformers with DOE's energy efficiency regulatory program for the same units. However, given that the goal of Energy Star is to establish voluntary standards that are more stringent than the existing DOE standards, it is not practical, in all instances, to assume that there are opportunities to establish such enhanced standards across all of the liquid immersed distribution transformers regulated by DOE.

For example, we strongly recommend that the scope of the specification should be limited to liquid immersed distribution transformers operating between 1 and 34.5 KV, with a size rating of 10 through 500 KVA for single-phase units and 15 through 2500 KVA for three phase units.

As we previously stated in our September 16, 2015 comments on the first draft, single-phase units larger than 500 KVA should not be included in the Energy Star program. Single-phase transformers are mostly Pole Type, for which size and weight are critical parameters. Because more energy efficient transformers require larger core and coil assemblies and are thus heavier (and often larger) than traditional designs, utilities are already facing challenges using DOE compliant Pole Type transformers on their existing infrastructure (i.e. poles). Imposing more stringent efficiency specifications under Energy Star would further increase the weight and size of these units, making it unlikely utilities would be able to use them, especially those in the upper KVA range, without expensive changes to their power distribution infrastructure (such as poles, etc.). In any event, single-phase units in sizes above 500 KVA are produced in very small volumes. Therefore, single-phase units larger than 500 KVA are just not good candidates for Energy Star, and entry 1.A.2.d should be modified accordingly.

Three-Phase submersible and network transformers that are designed for vault applications should also be excluded. These transformers have restrictive dimensional requirements, due in part to customer specifications (which are often dictated by existing vault installations) and IEEE standards. The modifications to these units necessary to allow them to meet the proposed Energy Star efficiency criteria would result in larger units that would typically be unsuitable for existing vault applications. The volume of these products is also a small piece of the distribution transformer market. Therefore, Three Phase submersible and network transformers that are designed for vault applications should be added to the list in 1.A.2.e of excluded transformers.

Insulation Level (BIL) for Energy Star units should be limited to 150 KV BIL and below. The efficiency levels already established by DOE for units above 150 KV BIL are presently very challenging to achieve. Establishing even more stringent levels for Energy Star would not be useful or practical. The volume of transformers produced above 150 KV BIL is also extremely small, making them unattractive candidates for Energy Star.

Lastly, so as to avoid ambiguity about the applicability of energy efficiency standards to transformers with multiple ratings, Howard strongly believes that the Energy Star program should be limited to units with only one KVA size rating listed on the nameplate. Should EPA nonetheless consider allowing multiple KVA units to participate in Energy Star, the circumstances of that participation should be strictly limited. Large 3-phase units with more than one rating might be allowed to participate, but only if the applicable standard and the demonstration of conformance with the standard take into account and requires the engagement of the fans, pumps or similar equipment necessary to operate the unit at the higher KVA ratings. In addition, it might be acceptable to include duplex units with two KVA ratings, but only so long as it is clear that each portion of the duplex unit must meet the applicable criteria for their respective KVA ratings. Otherwise, multiple KVA units should not be allowed to participate in Energy Star.

3. Operational Power States

Because losses vary depending on voltage applied, we believe that the definition of No Load (or Core Loss) should be modified to read as follows: “means those losses that are incident to the excitation of the transformer “at rated voltage””.

CERTIFICATION CRITERIA

1. Use of IEEE Standards

First, all transformers should be required to meet the IEEE National Standards.

In addition, only final and approved IEEE standards should be used in the Energy Star specification. In section 3.2.1(i) (line 92), EPA cites to IEEE PC57.120/D13 in its description of the calculation of Total Owning Cost (“TOC”). As EPA notes, this IEEE standard is still under development (as of March 2016 it was at Draft 15) and thus subject to change. Relying on a standard that is still under development for a central element of the certification criteria introduces unnecessary uncertainty into the criteria.

2. Core Types

EPA should not include in the specification transformer materials that are not commonly used or available. For example, the table after line 192 shows TOC savings for transformers using 8 different types of “core iron.” Our core iron suppliers have informed us that 3 of these materials, DR80, ZDMH and MOH, are special, low volume core materials, and that there are no plans to increase the availability of these types of core iron. Since these core iron materials are not generally available and not used on any regular production basis, they should not be relied upon or referred to in developing and finalizing this specification.

3. Load Factors

This Specification needs to more clearly define and simplify the information that the final user must provide the manufacturer at the time of order, particularly the load factor. In Draft 2, they would have to provide the exact load factor at which the Energy Star unit will be certified to meet the specific minimum efficiency. However, this will be very difficult for users to consistently calculate.

Further, from the manufacturer’s perspective, just trying to accurately determine the required minimum efficiency based on the Energy Savings over a minimum DOE compliant design using Equation 2 (Lines 135 & 136) is difficult. Our preliminary analysis has shown that the formula is complicated and susceptible to calculation errors and is likely to produce inconsistent results between manufacturers. We are concerned about rounding errors also. This will be very difficult for the manufacturer to correctly determine.

We are also concerned that the users may start requesting quotations on multitudes of ratings with various load factors, creating a severe and unmanageable burden on manufacturers just to produce quotes.

To address this issue, we suggest that 3 exact load factors be selected out of each of the three (3) groups in Table 1 and that a minimum efficiency requirement be set for each in addition to the required minimum DOE efficiency. For instance, set a minimum efficiency requirement for 15%, 35% and 65% load factors. This would result in a more practical and efficient process for both manufacturers and users.

TESTING – CERTIFICATION BODY

At the outset, as discussed above, the certification criteria are complex and would make demonstrating conformance very burdensome if left unchanged. In particular, specifying three specific load factors with minimum efficiencies will go a long way towards making implementation of the specification practical.

Further, we are concerned that the certification process proposed by EPA does not fully take into account the nature of the transformer business and may discourage manufacturers from participating. We appreciate that EPA proposes to allow manufacturers to use the same laboratory testing procedures as well as modeled results from the alternative efficiency determination method (“AEDM”) that can be used for purposes of demonstrating compliance with DOE standards. However, we think that EPA has underestimated the burden of applying the typical Energy Star approach to the transformer sector.

The distribution transformer sector is different from other consumer and commercial products in the Energy Star program. These are not “off the shelf” items that are manufactured in a set number of models that go into inventory. Rather, it is a customer driven sector in which the customer specifies the performance parameters that they need for very specific applications and installations, a process that usually involves a dialogue between the customer and the manufacturer’s engineers. The manufacturer then builds the distribution transformers to fulfill those specific needs; they are not just pulled off the shelf. Applying the “base model” concept does not simplify this issue, since regardless of the nomenclature or classification, distribution transformers are typically designed and manufactured on a custom basis. Therefore, the nature of this product is very different from the products now in the Energy Star program.

For that reason, EPA’s concept that third-party certifiers could conduct “desk reviews” of transformer designs to ensure that they are within the necessary parameters of certified models will not, in most instances, be practical. This is not a situation where, as in other product sectors, high-volume derivative designs are easily evaluated against a limited number of “base” certified models. Accordingly, we do not expect that direct third-party verification will be a practical or economically attractive option for demonstrating conformance to the specification.

Lastly, while we appreciate EPA’s proposal to allow manufacturers to use their existing DOE testing and AEDM procedures for Energy Star purposes as well, requiring compliance with the Certification Body’s (CB’s) Supervised Manufacturers Testing Lab (SMTL) Program on top of what DOE requires will be burdensome and costly. This will serve as a disincentive for transformer manufacturers to participate in Energy Star while not adding any value. EPA should not, as part of the voluntary Energy Star program, make it more difficult for a manufacturer to certify the validity of its testing than what is required by the DOE to verify compliance with the legally required efficiency standards. We are concerned the Energy Star program will not be economically justified if it mandates that DOE-compliant verification procedures have to be verified by this type of third party certification requirement.

CONCLUSION

Howard Industries appreciates the opportunity to submit our comments on this initiative to promote more efficient transformers and we look forward to continuing to work with EPA to develop a practical and meaningful Energy Star Distribution Transformer program.

If you have any questions or need further clarification on any issue, please do not hesitate to contact me at 601 422-1539.

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